

動物科學與畜產系

Department of Animal Science

一、必修科目 Required Courses

146001 專題討論 4 必 畜產老師, 上

本課程旨訓練研究生對於與畜產科學或論文有關的題目，經由資料之收集、研讀與彙整，令學生從而習得相關之專業知識，並日之獲得資料之分析、歸納與邏輯思考、試驗設計與統計、數據分析與統整之能力。並藉由書面報告、口頭發表及討論之歷練，以培養學生之論文撰寫能力及口頭表達能力。

142001 Seminar 4 R Faculties, F, S

The purpose of this course is to give graduate students the trainings on searching information, reviewing references related to animal science or their research topics, therefore, the abilities on logical thinking, experimental design, data collection and analysis, results discussion. Students are required to select a topic in the field of animal science or that related to their thesis. Students must give oral presentation and dissertation.

二、選修科目 Selective Courses

146002 動物試驗設計 2 選 劉世祥, 上

本課程旨在介紹試驗設計於控制動物試驗誤差之有效應用，並伴隨著適當的統計分析法，應付不同形態與性質之資料。授課內容主要包括優良試驗法則、完全隨機設計、拉丁方設計、交叉設計、複因子設計、不均衡設計、巢式設計與變積分析等。

146002 Experimental Designs 2 S S.H. Liu, S

for Farm Animals

The aims of this course are to state the error control via optimum design and the application of robust statistical methodologies for various types of dataset from farm animal experiment. The main content covers the principles of good experiment, completely randomized design, Latin square design, change-over design, factorial design, unbalanced design, nested design and analysis of covariance.

146003 應用畜產微生物 2 選 林美貞, 上

本課程討論微生物資源運用、發酵產品生產以及防治有害微生物的原理和方法。內容包括菌種選育、微生物發酵、發酵食品、食品污染與腐敗、食品保存與微生物管制等，並討論畜產相關微生物之最新資訊。

146003 Applied Microbiology 2 S **M. J. Lin, F**
in Animal Science

This course discusses the utilization of microbiological resources, the production of fermented products and prevention of pathogenic and spoilage microorganisms. The content of this course includes culture selection, fermentation, fermented foods, food contamination and spoilage, food preservation and microbiological control, and the new information of related subjects.

146004 動物科學文獻選讀 2 選 金宗老師，上

本課程將講授論文寫作與研究方法的基本架構、必要原則、及重要關鍵。透過研讀畜產科技中各種不同知識領域（遺傳育種、生理、營養、飼養、乳品和乳品加工）的中英文期刊論文，訓練研究文獻選讀論文查詢、英文論文閱讀、科學論文的研究方法與寫作技巧。

146004 Literature Studying 2 S **Faculties, F**

This course will teach graduate students the basic structure, logic and important rules of both research methodology and scientific writing. It includes studying both Chinese and English published papers in various fields of animal science, including genetics, breeding, physiology, nutrition, feeding, meat processing and dairy processing. The aim of this course is to improve students' ability on paper searching, English literature studying, research techniques and scientific writing skills.

146005 專科英文寫作 2 選 林美貞師，上

本課程旨在訓練研究科專業英文之寫作，本課程將針對個人於英文科學論文寫作易有之用詞錯誤、文法錯誤及邏輯編寫錯誤加以探討。期望研究科於修習本課程後，具備撰寫論文英文摘要之能力。

146005 Scientific Writing in 2 S **M. J. Lin et al., F**
English for Chinese Authors

This course will be emphasis on writing. After successfully completing this course, the student will have obtained confidence and new skills to write scientific English sentences without serious grammatical errors, avoid errors in English that are most common to Chinese authors, prepare a summary in English of a scientific paper in Mandarin, plan and organize a research project and describe it in a scientific paper, and complete an effective resume for employment application.

146006 科學論文寫作 2 選 沈朋志、
林美貞，上

本課程旨在訓練研究科對相關論文查詢、資料蒐集、整理、引用及表達的能

146013 經濟動物繁殖管理特論**2 選****劉煥煥, 上**

本課程係以文獻檢討之方式，介紹近年來在畜繁殖技術方面之進展。課程內容包括：發情與配種之人工控制，包括發情同期化及排卵時間之控制；季節性繁殖家畜之季節外配種控制，特別是在綿羊與山羊；家畜胚之體外生產技術，包括卵母細胞之體外成熟、體外受精及受精卵體外培養至囊胚階段；家畜精液與胚之冷凍保存技術，由傳統慢速冷凍發展至玻璃化冷凍；精子與胚之性別鑑定，包括 flowcytometry 與 PCR 技術之應用；胚操作與移置相關技術；家畜之複製，以細胞核移置及複製後之相關問題為主。

**146013 Special Topics on Farm Animal
Reproductive Management**
2 S**B. T. Liu, F**

This subject provides the introduction of the progress on reproductive technology in farm animals in recent years through reference reviewing. The contents of the subject includes: Artificial control of estrus and breeding, including estrus synchronization and control of ovulation timing. Control of breeding in seasonal breeders out of season particularly in sheep and goat. Production of embryos in vitro including maturation and fertilization of oocytes, and culture of embryos until blastocyst stage. Cryopreservation of semen and embryos, development of vitrification method out of conventional slow freezing method. Sexing of spermatozoa and embryos including the application of flowcytometry and PCR techniques. Manipulation and transplantation of embryos. Cloning of farm animals mainly the nuclear transfer and associated problems after cloning.

146014 線性模式與育種**2 選****張秀鑾, 上**

本課程主要目的在探討線性統計模式之一般估計量與統計假說之檢定，及其於遺傳育種之應用。內容除著重於統計育種之理論基礎外，尚包括應用矩陣代數於線性模式之統計分析與 SAS 電腦套裝軟體之理論背景闡釋，建立統計分析正確理念與提升學生應用 SAS 系統之熟練能力。

146014 Linear Model and Breeding
2 S**H. L. Chang, S**

The aims of this course will be emphasis on the study of the general estimation problems and test the testable hypothesis for linear statistical model, and thus applied to the genetic and breeding aspects. In addition to theory of statistical breeding, topics will cover useful matrix algebra for linear model methodology and statistical insights of SAS package, and thus enhance the students' ability when the statistical package employed.

146015 數量遺傳與動物模式論**2 選****張秀鑾, 上**

課程旨在延伸線性統計模式與分析方法之應用，主要著重於應用動物模式於畜禽動物遺傳評估與選種策略之整合應用。內容包括動物模式介紹、種畜係關係數與近親係數估計、動物模式延伸、多性狀動物模式與非累加遺傳模式建立與應用。

146015 Quantitative genetics and
2 S**H. L. Chang, F**

animal model methodology

This graduate course is intended to extend the application of linear statistical models and methods in the genetic evaluation and selection strategy for farm animal with focus on animal model methodology. Course content includes animal model introduction, estimation of relationship and inbreeding coefficients, animal model extension, multiple traits animal model and non-additive genetic model building and application in farm animal selection program.

146016 遺傳參數估計 2 選 張秀鑾, T

課程目的在使學生熟悉遺傳評估用之各項遺傳參數定義與性質，使其能正確應用於經濟動物改良實務面。授課內容包括畜產動物間親屬共變方、重要經濟性狀相關、變方估計法、遺傳變變方估計與應用。

146016 Estimation of genetic parameters 2 S H. L. Chang, S

The objectives of this course are to provide an understanding of genetic parameters including definition, attributes and application in selection program for animal industry. Material covers covariance between relatives, correlations among economical important traits, estimation methodology for variances, and evaluation of genetic parameter estimator, as well as the potential practiced in production level.

146017 應用生物資訊學 2 選 劉一軒, J

本課程旨在透過序列分析與電腦運算方式闡釋，使學生瞭解基因實功能表現與生物性狀之關係，培養學生熟悉生物資訊庫之搜尋程序與資源應用技術。課程內容包括網路資源介紹、序列比對、分析與註解、應用軟體介紹與公開網站與資料庫搜尋。

146017 Applied Bioinformatics 2 S S.H. Liu, F

The course is to explore the relationship between proteomic and biological traits via sequence analysis and computation protocols, and thus provides students with skillful techniques in both searching and resources application for bio-databases. Course content includes an introduction of web sites, skill in sequence alignment, analysis and annotation, useful software application, and public web and databases searching capability.

142018 動物基因轉殖特論 2 選 沈明志, T

本課程主要目的為希望結合胚胎學，各種基因轉殖操作技術與基因表現調控理論，讓學生了解基因轉殖的基本知識及其於農業及醫學之應用層面，課程內容，包括受精卵收集處理與培養、標的基因之構築、基因轉殖方法、胚胎培養、胚移植、標的基因之鑑定、轉殖基因品系之評估、基因表現調控、以及基因轉殖動物與人類醫藥開發的實。

142018 Specific Topics on 2 S P. C. Shen, S

Animal Transgenics

The purpose of this course aims to combine the embryology, the techniques of animal transgenics and the regulation of gene expression for the students to understand the principle and knowledge of animal transgenics and its application in agriculture and Medical science. The contents include: the collecting and culture of zygote, construction of target gene, introduce the techniques of animal transgenics, embryo culture, embryo transfer, identification of target gene, evaluation of transgenic lines, regulation of gene expression, production of transgenic animal and medicine protein for human.

146019 家畜營養生理學

2 選

謝家榮, 上

本課程主要探討家畜營養與生理之關係，瞭解如何從營養觀點在維持正常健康之家畜，以及不適當的營養對家畜所造成之影響。課程內容包括：各種營養素之營養生理功能、討論各種動物之消化系及其營養生理、進一步探討不同生理功能及生理階段之特殊營養需要。

**146019 Special Topics on Animal
Nutritional Physiology**

2 S

H. H. Hsieh, F

The objectives of this course are: To discuss the relation between animal nutrition and physiology, To understand how to maintain animal health through nutrition, To address the influence of improper nutrition on animal production. The course contents include: The physiological functions of all nutrients, include carbohydrate, lipid, protein, vitamins and minerals, discussion on the digestive physiology of different animals and the roles in nutritional physiology, further discussion on the special nutritional needs in various physiological functions and phases.

146020 消化生理學

2 選

余祺, 上

本課程旨在探討動物消化腺所分泌之消化液、調節作用功能、對營養之利用及保護動物體免受病菌感染之免疫機制。主要內容包括：消化道之解剖生理、消化器官之生長發育、消化液之分泌調節、營養消化吸收及排泄、腸道微生物、及腸道黏膜免疫機制。

146020 Digestive Physiology

2 S

C. Yu, F

The objective of digestive physiology is to introduce the digestive enzyme secretion, nutrient requirement and metabolism, and gastro-intestinal tract immunology. The major concepts of this course include: anatomy of the gastro-intestinal tract, growth and development of the digestive system, regulation of digestive enzymes, digestion, absorption, and excretion of nutrients, microbiology of the gut, and immune response of intestinal mucosa.

146021 動物代謝調節

2 選

余祺, 上

本課程旨在探討動物各器官組織之營養代謝及調節方式，以培養學生研習營養代謝調節之相關課題能力。主要內容包括：腸道及血液內營養之運輸、營

營養於肝臟之代謝、肌肉及腦之能量等之實代謝、脂肪組織、腎臟之營養代謝、腎臟代謝及電解質平衡。

146021 Animal Metabolic Regulation 2 S C. Yu, S

The objective of this course is to discuss the metabolic regulation of different organs and tissues in farm animal. Students will familiar with the metabolic regulation of nutrients and apply the principle on their research. The main contents of this course include: transport properties in blood and gut, nutrients metabolism in liver, protein and energy metabolism in muscle, adipose tissue, nutrients metabolism in bone, kidney metabolism, and electron balance.

146022 生長發育學 2 選 張長中, 上

本課程目的主要是探討動物生長，瞭解生長後可用於育種、營養、產品、生物工程等，其內容包括：細胞發展與身體組成、生長控制機制、胚胎生長、骨骼生長發育、脂肪生長發育、肌肉生長發育、身體組成生長曲線、身體生長量測、生長遺傳控制、營養對生長之影響、激素對體組成之影響、環境對體組成之影響、肌肉量和質的關係、生長與性成熟。

146022 Growth and Development 2 S L. C. Hsia, F

The purpose of the course is to study animal growth; consequently the knowledge can be applied to animal breed, nutrition, meat science, biotechnology production, etc. The content will include: Cellular development and body composition; Growth control mechanisms; Prenatal growth; Bone growth and development; Fat development and deposition; Muscle growth and development; Body composition and growth curves; Methods to measure body composition; Genetic regulation of growth; Influence of nutrition on body composition; Hormonal influence on body composition; Environmental influence on body composition; Relationship of muscle quality to quantity; Growth and sex maturity.

146023 分子營養學 2 選 余琪, 上

本課程旨在介紹分子營養學的發展及現今研究之幾種營養素對基因表達的影響，並敘述基因多態性對部分營養物質之吸收、代謝及利用之作用。主要內容包括：代謝和基因調控、基因結構和基因表現、碳水化合物、蛋白質、脂肪對基因表達的調控、維生素及礦物質對基因表達之調節，及分子營養學之展望。

146023 Molecular Nutrition 2 S C. Yu, S

The objective of this course is to introduce the development of molecular nutrition and up date information of nutrients on gene expression, and the function and metabolic pathways that the genes involved. The major concepts include: metabolism and regulation, gene structure and gene expression, carbohydrate on gene expression, protein on gene expression, lipids regulation, vitamins and gene expression, minerals and gene expression, and the perspective of molecular nutrition.

146024 環境溫度與感官刺激 2 選 張長中, 上

本課程之目的在探討高環境溫度下，家畜產乳所遇到的問題及解決之方法。課程內容包括，熱帶畜物對動物產乳之影響，環境之定載，溫度相關知識，溫度對生理之影響，溫度和營養之關係，高溫對豬之影響，高溫對牛之影響，高溫對羊之影響，高溫對種雞之影響，高溫對肉雞之影響，高溫對母雞之影響，高溫對其他動物之影響，高溫對牧草產乳之影響。

146024 Environmental Temperature and Livestock Production 2 S L. C. Hsia, F

The purpose of this course is to study the effect of high environmental temperature on animal production, and how to solve the problems. The following topics included in the course. Animal production problem under tropical environment, environment, temperature, the effect of temperature on physiology, the effect of temperature on nutrition metabolism, the effect of high temperature on pigs, the effect of high temperature on cattle, the effect of high temperature on sheep and goat, the effect of high temperature on breed chicken, the effect of high temperature on broiler, the effect of high temperature on layer, the effect of high temperature on other animal, the effect of high temperature on forage grass.

146025 飼料技術特論 2 選 李定，T

本課程係討論家畜飼料之最新科技，其內容包括：飼料原料中抗營養因子之去除技術、配合飼料之製造技術與品質管、飼料配方設計技術、飼料科技之研發動向。

146025 Special Topics on Feed Manufacture Technology 2 S S

This course will discuss the modern science and technology of livestock feeds, which contains: Disjoin techniques on anti-nutrient factor of ingredient feeds; The processing and quality control of formular feeds; Design technique of livestock feed formulation; The research advancement of feeds science and technology.

146026 機能性畜產品之生產 2 選 鄭長武，J

本課程主要係探討各種機能性畜產品之生產技術，課程內容包括：機能性畜產品之市場現況、機能性畜產品之機能作用、免疫抗體之機能作用、雞蛋中生物活性物質之機能作用、機能性畜產品之生產技術(包括機能性蛋品、肉品及乳品等)。

146026 Production of Functional Animal Products 2 S C. Y. Cheng, F

The purposes of this course are to studies the production technology of functional animal products, which contains introduction on the currents situation of the production and marketing for functional animal products, the function of functional animal products, the function of immunoglobulin yolk (IgY), the function of active material in egg, the production technology of functional animal products of egg, meat and milks.

146027 家禽營養與飼養管理 2 選 謝家榮, T

本課程旨在使學生瞭解種禽的營養與飼養管理相關知識。主要內容包括育種、孵化管理、飼養技術、雞舍設備、飼料配方、及種禽種蛋生產效益。

146027 Nutrition and Management of Poultry Breeders 2 S H. H. Hsieh, S

The objective of this course is to introduce the advanced theory and practical operation technique of poultry breeders to students. The contents include: poultry breeding, incubation and hatchery management, brooding and rearing, houses and equipment, feed ingredients and nutrient requirement, marketing eggs, and marketing poultry.

146028 安全畜產品生產特論 2 選 斗定, T

本課程旨在探討抗生素造成之問題及取代抗菌藥物之畜產品生產。主要內容包括無藥物殘留畜產品介紹、取代抗菌藥物之物質與安全性畜產品、及無菌無污染之畜產品加工製成。

146028 Special Topics on Safe Animal Production 2 S S

Current topics in safe animal production will be discussed, with special emphasis on the problems of antibiotic residues, the various species of antibiotic replacers, and the production of free contamination safe animal products.

146029 畜產經營特論 2 選 斗定, T

本課程系統性地介紹畜產經營應具備之技能,包括:畜產企業管理學本涵、不同評價之成本項目與效益分析、畜產企業經營規劃與決策、畜產企業行銷、資料收集與分析、畜產企業政策與環保問題、預測方法、畜產企業組織、畜產企業產品生產與規劃、人力資源、畜產企業資金與預算、畜產企業控制原則、畜產企業成本與收益觀念、畜產企業經營目標之設計。

146029 Special Topics on Livestock Production Management 2 S S

This course gives a systematic knowledge for livestock production manager. It includes the contents as livestock business, cost evaluation and benefit analysis, planning and decision, livestock business marketing, information collection and analysis, policy and ecosystem protection, forecasting, livestock business organization, products and production planning, manpower resources, capital and budget, controlling, cost and revenue, and management indicators.

146030 乳品化學 2 選 林美貞, T

本課程討論原料乳及乳製品加工及儲存過程中之變化。課程內容包括供人類

Products Processing

This course set in the context of the concepts of technology, chemistry and microbiology of meat manufacturing processing, provide a full comprehensive understanding of meat science.

146034 畜產品之品質管制 2 選 不修，上

本課程主要討論畜產品之品質管制與衛生，家畜健康對畜產品品質的關係。主要內容包括屠前家畜的處理，肉品工廠中肉品管理，肉品處理與肉品工廠清潔。乳乳與授乳衛生，乳品一般處理及品質測定。

146034 Quality Control of Animal Products 2 S ,F

This course will discuss the quality control, sanitation and inspection of animal products, animal health in relation to the quality of animal products. The major chapter contents transportation and handling of livestock prior to slaughter, meat inspection, handling of meat, quality control of meat and meat plant cleaning, collection and reception of milk, general milk treatment, quality control of milk and milk products.

146035 食品加工特論 2 選 不修，上

本課程就發之利用以及過去與未來各式發製品之加工趨勢，分別就發之化學性狀，非食品類之利用，營養與功能性之修飾或發製品之設計等之技術等加以廣泛討論。

146035 Special Topics on 2 S F

Egg Products Processing

The course discuss wide range of egg uses and processing technologies including current and future world trends, separation technologies for egg chemicals properties, non-food uses, functional and nutritional modification or designing of egg products.

146036 禽畜副產物之利用 2 選 不修，上

本課程之主要內容包括：禽畜副產物之種類、生產量、價值與特性，腸衣、脂肪、明膠、血液、皮及羽毛、乳品副產物及發品副產物等之處理與應用，及禽畜副產物在食品加工、工業與醫學上之應用

146036 Utilization of Animal and Poultry Byproducts 2 S S

The major contents in this course include kinds, production quantity, values, and characteristics of animal and poultry byproducts. In addition, many byproducts, including casing, lipids, gelatin, blood, fat, and egg byproducts will also be addressed. Finally, uses of these byproducts in food processing, industries, and medical application will also be included.

146037 加工副原料之應用 2 選 林美貞, F

本課程討論畜產加工領域中除乳、肉及蛋以外之副原料之應用及原理。內容包括乳品、肉品及蛋品加工中常用之添加劑；營養強化物質及機能性成分物質之添加；食品添加物使用規範及相關法規；及畜產品作為其他食品產業副原料之應用。

146037 Applying Additives to 2 S M. J. Lin, S
Processing of Animal Products

This course discusses the application and principle of applying additives to animal products processing. The content of this course includes common additives of dairy, meat and egg processing; addition of nutrient fortification and functional ingredients; regulation of additives usage; and application of animal products on food industry.

146038 動物新產品開發之方法論 2 選 林美貞, S

本課程討論動物產品研發之流程、方法及整體評估方式。內容包括新產品設計、市場評估法、成本分析、風險評估、研發方法、製程調整及製造、產品包裝、相關法規及規範、專利及智慧財產權、動物新產品開發方針及趨勢。

146038 Methodology of Animal 2 S M. J. Lin, F
Products Development

This course discusses the developing procedures and evaluating methodology of new animal products. The content of this course includes designing new products, consumer research, prototype development, financial evaluation, risk analysis, technical plan, other R&D methodology, manufacturing, food packaging, safety and regulation, protection of intellectual property, and focal issue in animal science and food science.

146039 草食動物營養特論 2 選 斗定, S

本課程之目的在於介紹反芻動物生態系統之生物學，並探討此系統之問題與無法解決之困擾，並引導研究之未來研究之方向，課程內容包括：(1) 描述反芻動物生態系統，植物—微生物—動物交互作用與飼養策略 (2) 飼料作物化學 (3) 瘤胃功能與微生物學 (4) 後瘤胃之吸收與代謝 (5) 後腸發酵。

146039 Special Topics on Nutrition for 2 S F
Herbivores

The objectives of this course are introducing the biology of the ruminant ecosystem, pointing out the problems and unsolved puzzles in the system, and addressing the potential research direction for the entry-level graduate students. Course contents include description of ruminant ecosystem, plant-microbe-animal interaction and feeding strategy; forage chemistry; rumen function and microbiology; post-ruminal absorption and metabolism of host animal; and hindgut fermentation

146040 畜產污染防治與資源利用 2 選 沈定，丁

本課程目的在於介紹現存畜牧廢水處理系統，尋求經濟可行且因地制宜之系統，畜產廢棄物之減量與環境影響評估，畜產廢棄物之資源化利用，未來環保畜舍之評估，進而朝向清潔生產之目標，以達到畜牧永續經營之目的。

**146040 Livestock Pollution Control and 2 S
Resource Utilization**

The objectives of this course include to introduce the present animal wastewater treatment system, to pursue economical and flexible system, animal waste minimization and environmental impact assessment, the resource utilization of animal waste, future environment-friendly housing setup, animal cleaner production and to reach the goal of sustainable animal industry.

146041 動物複製學實習 1 選 沈朋志 上

本課程主要提供學生對於動物複製相關實驗之基本操作。課程內容包括：胚之培養與操作、受核卵母細胞之體外生產、供核細胞之製備及冷凍保存、受核卵母細胞之去核操作、供核細胞之注入、複製胚之電融合與激活處理。

146041 Animal Cloning Lab 1 S P. C. Shen F

This course is to offer students about the basic practice of animal cloning. The contents of the basic practice include: culture and manipulation of embryos, *in vitro* production of recipient oocytes, preparation and cryopreservation of donor cells, enucleation of recipient oocytes, microinjection of donor cells, cell fusion and activation of cloned embryos.